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PATENT SPECIFICATION

DRAWINGS ATTACHED

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915,519

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Index at acceptance: —Class 94(1), C(3H:10D3D:10T3:24B6: 25D:29C).

International Classification:—**B65b.**

COMPLETE SPECIFICATION

Improvements in and relating to the Production of Containers of Thermoplastic Material Filled with Liquid or Pasty Matter

We, JOHN TYE & SON LIMITED, a British Company, of 457—461, Caledonian Road, London, N.7, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to the production of containers of thermoplastic material filled with liquid or pasty matter.

Such filled containers are usually produced by filling a length of tubing and welding the tubing at intervals along its length by the application to it of welding electrodes which flatten the tubing transversely at the place at which they are applied.

Almost invariably, the containers have to bear some marking of an advertising or descriptive character and this has given rise to difficulties.

If a finned tube is used, such as one of those shown in the drawings of our Patent No. 786,188, whether produced by extrusion or the marginal welding of two superimposed sheets, no particular difficulty arises because the tube, before it has been filled, is flat and it can have matter printed on or otherwise applied to it which will be accurately positioned between the transverse welds which are made, after the tube has been filled, to form the desired containers and also accurately positioned laterally of the container.

When, however, an ordinary unfinned tube is used, difficulties arise if it is pre-printed because the tube has to be carefully flattened for printing and, after having been round when filled, has again to be flattened at the welding stage.

Tubing is generally received from the manufacturer in long, coiled lengths. In that condition, it is roughly flattened and has, along its length, irregular twists which become removed from it when it is filled. Consequently, if matter is printed on the tubing while it is flat, impressions can be produced which, while being originally aligned are no longer aligned when the tube has been filled. This lack of alignment can be avoided by printing after welding but the curvature of the containers excludes the use of the most economical printing processes.

In accordance with the invention, tubing of thermoplastic material is prepared for being converted into containers filled with liquid or pasty matter by transverse welding of the tubing after the introduction into it of the intended contents of the containers, by pre-welding the tube while in the flat, empty condition, at intervals along it where the final transverse welding is to be effected, with welds which, while leaving passages which ensure that the tubing can be subsequently filled, are sufficiently extensive to have the effect of setting any pre-existing torsional distortion of the tubing. When so prepared, the tubing can be printed in its flattened condition and the alignment of the printed impressions will not be upset when the tubing is filled and the final welding is effected.

In one simple manner of operation in accordance with the invention, the pre-welding consists in effecting at intervals along the tubing two welds which extend laterally inwards from the edges of the flattened tube without meeting each other. The gap between these two marginal welds is such as to allow the intended contents of the containers to flow relatively easily through it when the tubing is to be filled and is ultimately closed by the final weld which seals off a length of the tubing to form one of the filled containers.

Some examples of operating in accordance

with the invention will now be described in greater detail with reference to the drawings filed with the provisional specification (Figures 1 to 4) and those filed with this complete specification (Figures 5 and 6) in which:—

Figures 1 and 2 show diagrammatically the various stages in the manufacture from round tubing of filled sachets having flat ends;

Figures 3 and 4 similarly show the various stages in the manufacture of containers having necked ends; and

Figures 5 and 6 illustrate the defect which the invention is designed to eradicate.

Figure 5 shows a length of roughly flattened tubing taken from a coil and which has been printed at regular intervals along its length. The impressions are in good alignment lengthwise and are symmetrically disposed along the centre line.

Figure 6 shows the same length of tubing after it has been filled. When rounded, the tubing is freed from torsional strains and straightens out with the consequence that the printed impressions are no longer aligned. Consequently, when the tube is transversely welded as indicated in dotted lines in Figure 6, containers will be produced the impressions on which may be out of centre or twisted as shown in Figure 6. That defect can be avoided as will now be described.

Figure 1 shows a length 10 of thermoplastic tubing coming straight from the roll and therefore having the torsional strains or twists which have been referred to above.

The tubing is passed through a pre-welding station at which, at regular intervals along its length, the walls of the tubing are brought together as shown at 12. Two welds 12 are made which proceed from the edges of the flattened tubing towards each other but do not meet. They leave between them an unwelded area 14 which provides communication between the parts of the tubing on either side of the pair of welds.

The thus pre-welded tubing then passes through a printing station at which it is provided with any desired impression such as that shown at 16 in the drawings. The tubing can be passed through the pre-welding and printing stations in the course of a single run as indicated in Figure 1, or the welding and the printing can be effected in two runs as two completely separate operations.

The correct positioning of the tube at the two stations is important and in this connection use can be made of the welds 12 made at the pre-welding station. For example, these welds can have holes 13 punched in them (in the same operation as the welds are effected or in a sparate operation) and a pair of pins be provided somewhere along the length of the production line so that by engaging the pairs of holes successively on the pins, the tube can be advanced step-by-step and be positively held in the desired welding and printing positions. Alternatively, the welds can receive registration or indexing marks serving to control the operation of a relay in a circuit including a light-sensitive element.

The tubing having been so pre-welded and printed can then be filled with the liquid to be packaged. The passageway left at 14 between two welds 12 must be large enough to allow the liquid to be passed through it without too much resistance but for the best results should be no greater than is necessary.

The filled tubing is shown in Figure 2. It will be seen that the printed impressions have remained aligned and centred. This is because the welds 12 have set the torsional strains or twists and have held the tubing against straightening itself out.

To complete the individual packages, as shown in Figure 2, the filled tubing is passed through a final welding station at which the passageway 14 between two pre-welds 12 is closed. This can be done by the use of a pair of welding electrodes of the size and shape of the non-welded area 14 but it is preferable to use electrodes of a length approximating to the width of the flattened tubing and of a width greater than that of the pre-welds 12 so that they completely cover the pre-welds as shown at 18 in Figure 2. That avoids the necessity of very strict registration.

The final product is obtained by cutting through the weld along its centre-line indicated at 20 in Figure 2.

The pre-welds need not be in the exact form shown in Figures 1 and 2. For example, the two rectangular welds 12 could be replaced by three such welds leaving two passageways 14.

Nor need the pre-welds be rectangular. For example, they can, as shown at 12 in Figure 3, be roughly semi-circular. Then, by a final weld 18 and cutting through that weld along the line 20, containers can be produced which, after some trimming have necks 22 through which their contents can be dispensed, the outer ends of the necks being snipped off for this purpose at the time of use.

By the use of quadrant pre-welds, containers can be produced having one necked end and one plain end.

Figure 4 shows yet another example of the provision of containers with a necked end. In this case, the pre-welds 12 are rectangular but the final weld 18 is of such a shape as to cover the pre-welds but to close the passageway between successive containers over only a short part of its length. By severing

and trimming one then obtains containers necked at one end only as shown at the top of Figure 4.

The pre-welds need not be opposite each other, nor need the final weld extend across the tube at right angles to the axis of the tubing. It is essential only that the pre-welds leave between them a passageway for the intended contents of the containers and that the final weld obturate that passageway.

WHAT WE CLAIM IS:—

1. A method of preparing tubing of thermoplastic material for being converted into containers filled with liquid or pasty matter by transverse welding of the tubing after the introduction into it of the intended contents of the containers, comprising pre-welding the tubing, while in the flat, empty condition, at intervals along it where the final transverse welding is to be effected with welds which, while leaving passages which ensure that the tubing can be subsequently filled, are sufficiently extensive to have the effect of setting any pre-existing torsional distortion of the tubing.

2. A method according to Claim 1 in which the setting welds at each of the welding points extend towards each other from the edges of the flattened tubing without meeting.

3. A method according to Claim 1 or Claim 2 in which the tubing has descriptive or other matter applied to it by printing or otherwise while in the flat, empty condition after the setting welds have been effected.

4. A tube of thermoplastic material produced by the method of any one of Claims 1 to 3.

5. A method of producing filled containers comprising filling a tube according to Claim 4 and welding it at intervals along its length so as to close the filling passages left by the setting welds.

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915,519
1 SHEET

COMPLETE SPECIFICATION

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FIG.5.

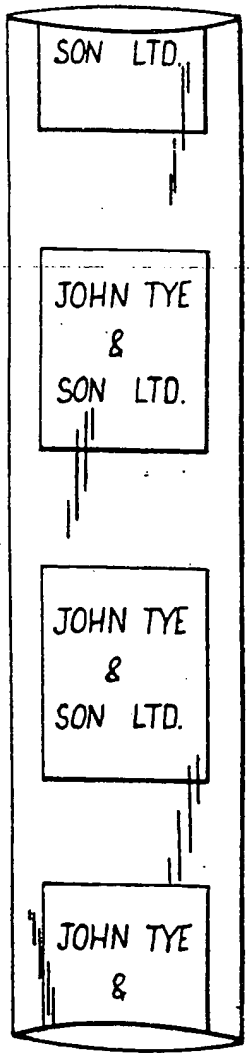


FIG.6.

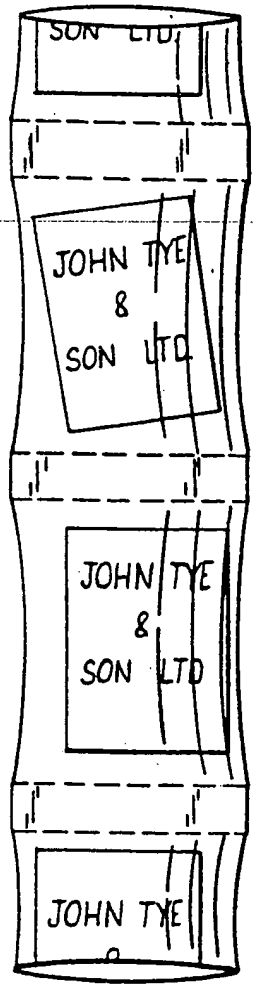


FIG. 1

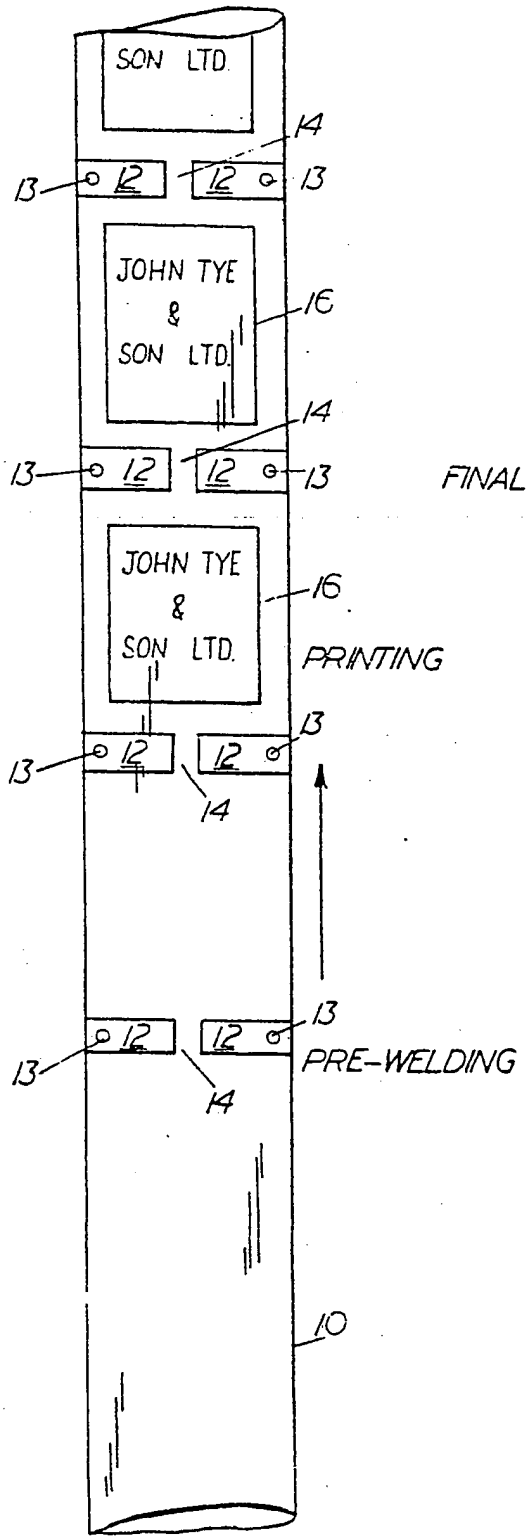
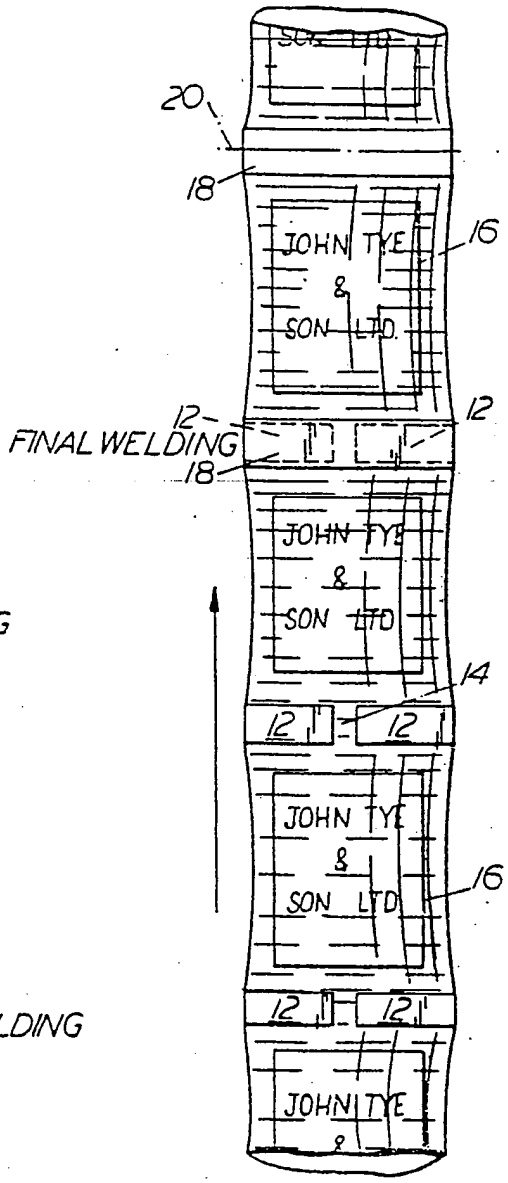

SON LTD.
14
13
12
12
13
JOHN TYE
&
SON LTD.
16
14
13
12
12
13
JOHN TYE
&
SON LTD.
16
PRINTING
13
13
12
12
14
13
12
12
13
PRE-WELDING
13
14
10

FIG. 2


20
18
JOHN TYE
&
SON LTD.
16
12
12
FINAL WELDING
18
JOHN TYE
&
SON LTD
14
12
12
JOHN TYE
&
SON LTD
16
12
12
JOHN TYE

915,519
2 SHEETS

PROVISIONAL SPECIFICATION

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SHEETS 1 & 2

:2

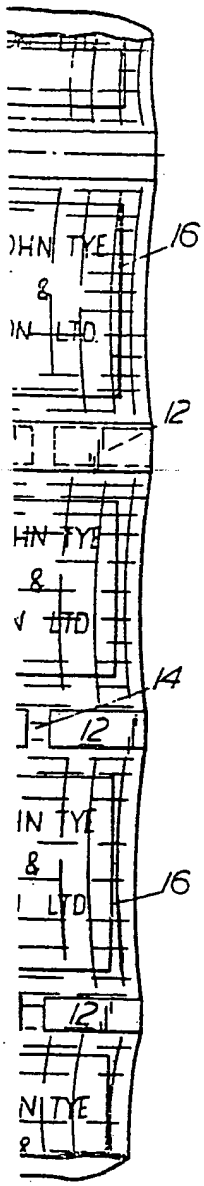


FIG.3

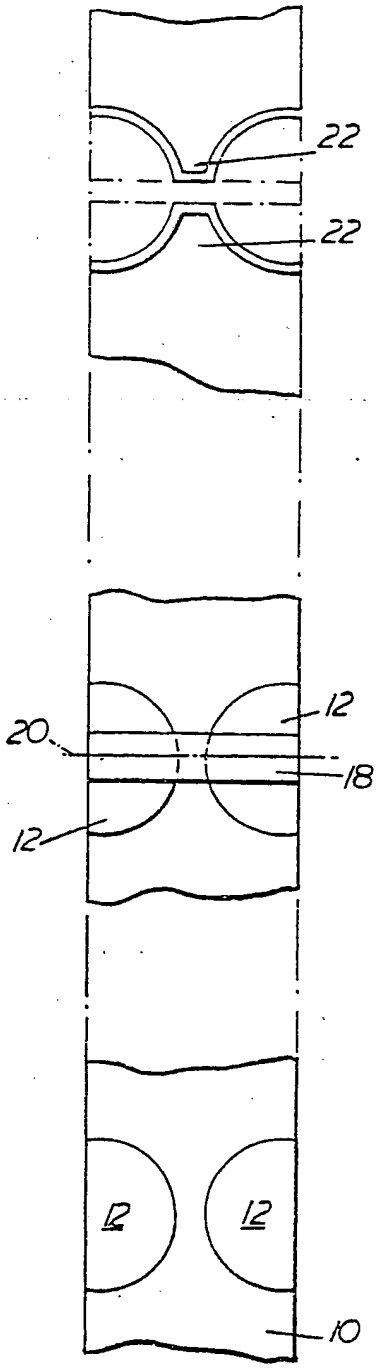
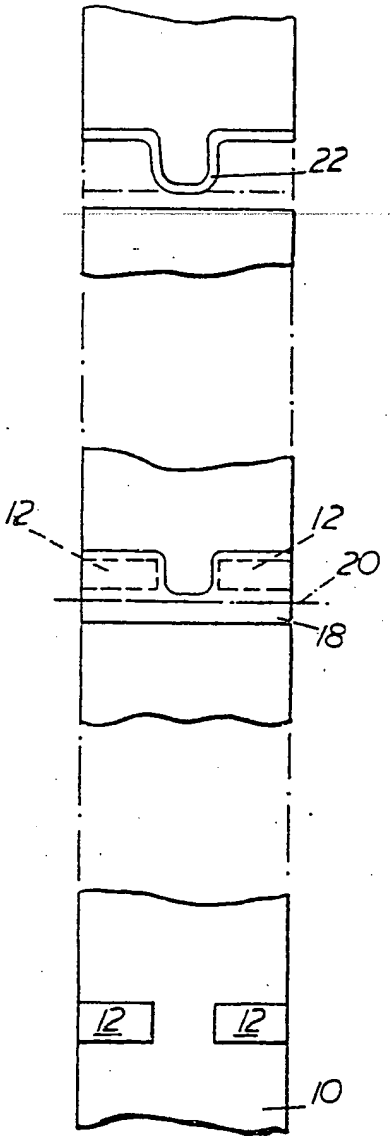


FIG.4



915,519 PROVISIONAL SPECIFICATION
2 SHEETS This drawing is a reproduction of the Original on a reduced scale.
SHEETS 1 & 2

FIG.1

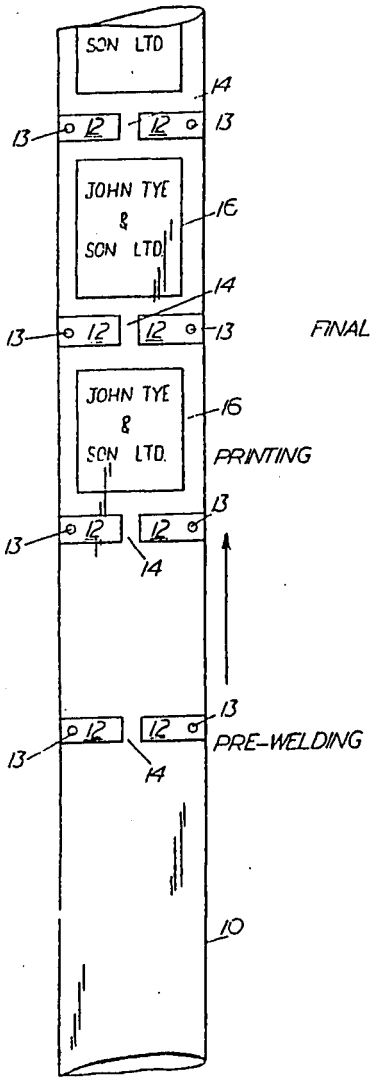


FIG.2

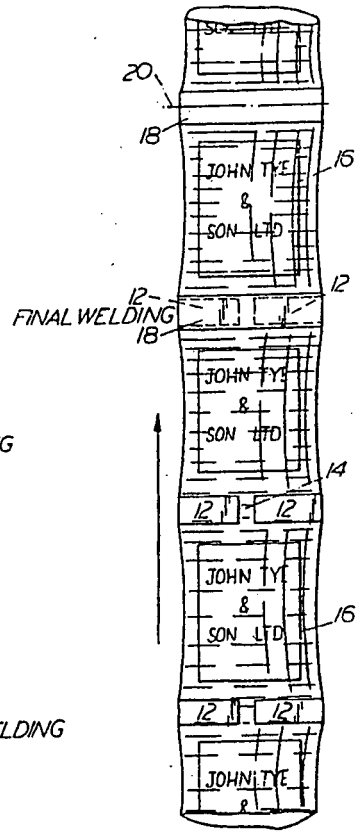


FIG.3

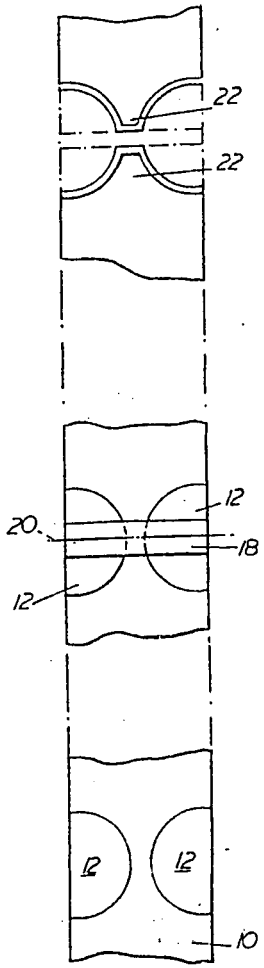


FIG.4